measuring apparatus, and it is to be hoped that all Weather Bureau observers will see to it that both apparatus and methods are so correct that an error of 1 per cent can not occur systematically.

A copy of the Editor's article "On the determination of the true amount of precipitation and its bearing on theories of forest influences" can be furnished to any observer who desires it.

The large differences between adjacent gages are usually due chiefly to wind effects. Two similar gages set on posts in an open field, the mouths being elevated above ground 1 or 2 and 4, 5, or 6 feet, respectively, give the data for determining approximately the correction to the lower gage, so as to get results approximately free from the wind effect.

If the altitudes are H_1 and H_2 and the corresponding catches C_1 and C_2, then the the true rainfall is approximately

$$R = C_1 + \frac{\sqrt{H_1}}{\sqrt{H_2}-\sqrt{H_1}}(c_1-c_2) = C_1 + \frac{1}{\sqrt{\frac{H_2}{H_1}}-1}(c_1-c_2).$$

Example: $C_1 = 25.50$ inches for $H_1 = 2$ feet, and $C_2 = 23.00$ inches for $H_2 = 6$ feet. Then will $R = 25.50 + 1.366 \times 2.50 = 28.91$. In other words, the lower rain gage, 2 feet above the ground, catches only 88 per cent of what would be caught by a pit gage at the surface of the ground in calm weather. This corresponds to an annual rainfall in the drier portions of our country and to strong winds or small raindrops. When every individual rainfall through the year has been computed in this manner, it may be possible to arrange the deficits in the order of the observed general velocity of the wind and determine the specific influence of feeble and strong winds on small or large raindrops and on snows, and on protected gages as distinguished from those that are freely exposed to the wind.

SEISMOGRAPH STATIONS IN THE UNITED STATES.

We are informed that in 1889, Mr. A. Lawrence Rotch, the distinguished patron of meteorology, purchased and set up at the Blue Hill Observatory, a Ewing-Holden seismograph, as made in San Francisco. During the first year that the instrument was maintained in working order no records were obtained. Recently the Massachusetts Institute of Technology has built a geodetic observatory for educational purposes, in the Middlesex Fells, north of Boston, in an isolated situation, and Mr. Rotch has given his seismograph to the Institute, so that it will now be installed at the new observatory within a few months. A description of this observatory is published in the Technology Quarterly for June, 1899.

We hope that this augurs well for regular seismological work in the United States, a matter that has been much neglected, except possibly in California.

It has always been the custom for meteorological observers, especially those of the Smithsonian system, to record the occurrence of earthquakes. In 1874, the present Editor, in reorganizing and extending the field of the MONTHLY WEATHER REVIEW began the regular publication of earthquake notes, so far as observations were received, and, in 1883, at his request, a joint committee on earthquakes was organized in Washington, by cooperation with the Coast Survey and Geological Survey.

This whole subject is a branch of geo-physics, coordinate with the study of vulcanology, surface geology, meteorology, tides, etc., and is worthy of special recognition. It is to be hoped that the article on the Milne seismograph, published in the MONTHLY WEATHER REVIEW for May, will revive active interest in the subject.

At present the only stations in the United States that are known to keep seismographs of any kind in continuous operation ready for any earthquake that may occur, are the following seven: Washington, D. C., (Weather Bureau, Marvin seismoscope); Middlesex Fells, Mass., (one mile from Malden, Geodetic Observatory, Ewing-Holden seismograph); Cleveland, Ohio, (Prof. E. W. Morley, Adelbert College, Gray seismograph); Lick Observatory, Cal., (Mount Hamilton, Ewing-Holden seismograph); San Francisco, Cal. (Observatory of the Coast and Geodetic Survey, G. W. Davidson, Director, Ewing-Holden seismograph); Mare Island, Cal., (Naval Observatory, Everett Hayden, Superintendent, Ewing-Holden seismograph; latitude, 38° 05′ 55.8″ N.; longitude, 122° 16′ 19.3″ W., on the crest of a hill about 60 feet above mean low water and near the northern extremity of the island; the seismograph is set up on a pier in the transit room); Oakland, Cal., (Chabot Observatory, Professor Burchalter, Ewing-Holden seismograph).

Prof. E. C. Pickering states that a Milne seismograph has been sent by him to his observatory at Arequipa, Peru, and is probably now in operation there. There are also seismoscopes on hand at the Harvard College Observatory at Cambridge, Mass., but they are not in use owing to the proximity of the electric cars.

As the vibrations of the ground caused by the electric cars are quite superficial we hope that Professor Pickering will find a suitable location for observing the genuine earth tremors and that all these stations will kindly send regular reports to the MONTHLY WEATHER REVIEW.

BACK NUMBERS.

Mr. A. Lawrence Rotch, Director of the Blue Hill Meteorological Observatory (post office Hyde Park, Mass.), desires to obtain the following numbers of the American Meteorological Journal, viz: June, July, and August, 1884, of Vol. I; June and July, 1885, Vol. II; September, October, and December, 1886, Vol. III.

TEMPERATURES IN THE SUNSHINE.

In the June report of the Colorado section, Mr. F. H. Brandenburg gives a summary of some observations made at Denver, Colo., by Mr. A. G. Eneas, of Boston, Mass. Mr. Eneas used standard thermometers with black bulbs, placed within a so-called hot box, which was constructed of seasoned pine wood five-eighths of an inch thick. Its dimensions were 9 by 3.5 by 2 inches. The cover was made of two plates of fine crystal plate glass. The inside of the box was stained with bright green water-color paint and then coated $\frac{1}{32}$ of an inch thick with lamp black. The same apparatus had been used by Mr. Eneas in Boston before he made a series of observations for several months at Denver. The greatest difference observed at Boston between the outside air temperature and the interior hot-box temperature was 40° C., or 90° F. The similar maximum difference at Denver was 98.5° F. This excess may be largely due to the pure air of Colorado or it may be due to various nonmeteorological causes. Such observations are not to be recommended, since it is so easy to do better work.

This form of hot box is one of several methods of illustrating, not measuring, the total radiation of the sun by means of its heating effects. The best form of hot box was that invented by Pouillet, more properly called the pyrheliometer, and was filled with water, which was continually stirred, so that the total amount of heating effect could be more certainly measured by the thermometer. But such apparatus